PIONEER SYNTHETIC FUELS FACILITIES

EARLY APPROACHES TO ACHIEVING ENVIRONMENTAL ACCEPTABILITY

A REPORT TO

THE SECRETARY OF ENERGY

FEBRUARY 24, 1984

Advisory Committee
on
Federal Assistance for Alternative Fuel
Demonstration Facilities

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Demonstration Facilities

February 28, 1984

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The Honorable Donald P. Hodel
Secretary
U.S. Department of Energy
Forrestal Building 7A257
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Mr. Secretary:

In behalf of the membership of the Advisory Committee for Alternative Fuels Demonstration Facilities, I am pleased to submit the enclosed report, "Pioneer Synthetic Fuels Facilities", February 24, 1984, for your consideration. The Committee, at its recent meeting conducted in Arlington, Virginia, on February 24, 1984, has unanimously adopted this report and endorses its conclusions and the recommendations it contains for your consideration.

The report is presented in two parts. The Executive Summary presents the Committee's recommendations and conclusions in support of a synthetic fuels capability in the United States. The remainder of the report contains information obtained by the Committee on three major synthetic fuels projects now under construction: Great Plains Coal Gasification Project, Union Oil's Parachute Creek Shale Oil Project, and the Cool Water Combined Cycle Coal Gasification Project.

The Committee further recommends that copies of the report be provided to the U.S. Synthetic Fuels Corporation's Chairman and Board Members, as well as to those Congressional Committees with authorization, appropriation, and oversight responsibilities for synthetic fuels. The Committee has appreciated this opportunity to serve in your behalf. We hope to be of continuing value.

Sincerely,

Allen I. Olson
Governor, North Dakota
Chairman, Advisory Committee for
Alternative Fuels Demonstration
Facilities

Enclosure

CONCLUSIONS AND RECOMMENDATIONS
for Federal Involvement and
Environmental Acceptability
of Alternative Energy and Synthetic Fuels Projects

EXECUTIVE SUMMARY

The Advisory Committee on Alternative Fuels Demonstration Facilities has arrived at consensus viewpoints regarding the Federal role in the development of a synthetic or alternative fuels industry. A particular focus of these viewpoints concerns the financial, environmental, health, safety, and socioeconomic acceptability of early and future projects. The Committee has investigated and truly reviewed these aspects through site visits to three commercial facilities, in both formal and informal meetings, and has documented supporting case studies in the report "Pioneer Synthetic Fuels Facilities: Early Approaches to Achieving Environmental Acceptability." Based on these investigations, it is clear that there is an unchallengeable need for an aggressive Federal role in the development of alternative energy and synthetic fuels projects. An executive summary of the several specific conclusions and recommendations which have been derived by the Committee in this regard follow.

The need for a Federal financial role is warranted. Funding for commercial-scale projects should continue where they are undertaken with a demonstrated probability of future economic feasibility in private sector programs.

A consolidated Federal approach to financial assistance is needed. Funding of commercial-scale synthetic fuel projects should eliminate "buck passing" between agencies.

A consolidated Federal approach to ensuring necessary permits for alternative fuels facilities would facilitate project approvals. The Federal Government should consider a "lead agency" concept or one-stop coordination process for all involved Federal agencies.

One-stop project approval processing at the state and local level should be encouraged by the Federal Government. If state or local standards are similar or more stringent than Federal requirements and a monitoring scheme is in place, Federal involvement should focus only on ensuring their enforcement by state or local governments.

The Federal Government must continue to monitor synthetic fuels and alternative energy projects on a credible and independent basis for both known and suspected hazards. Such monitoring must be carefully documented and maintained so the reports will be readily available at the appropriate time to regulatory authorities for the establishment of effective regulations, and to the private sector.

The Federal Government should encourage consideration of the effect of unanticipated termination of projects. This consideration should be an integral element in the review and impact study of each project, and documented in the form of a contingency plan. Agreements for financial assistance should contain explicit requirements for notice to Federal, state, and local governments whenever there is reasonable evidence that termination is under serious consideration.

The Federal Government must ensure the existence of necessary data for expedited decisions in the event a national emergency dictates a "crash" program. Coordinated monitoring of early synthetic or alternative fuel projects would ensure that this important opportunity for gathering both technical information and socioeconomic research data is not lost.

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FOREWORD

On January 27, 1982, the Secretary of the U.S. Department of Energy established the Advisory Committee on Federal Assistance for Alternative Fuels Demonstration Facilities. The Advisory Committee was created by Congress under the Federal Non-Nuclear Energy Research and Development Act.[1] It is composed of Governors and representatives of Indian tribes, industry, environmental organizations, and the general public, all of whom are designated by the Secretary. At present, the Advisory Committee is comprised of the following 11 members:

Honorable Allen I. Olson (Chairman)
Governor of North Dakota
Bismarck, North Dakota

Honorable James B. Hunt, Jr.
Governor of North Carolina
Raleigh, North Carolina

Honorable John N. Dalton
Partner
McGuire, Woods & Battle
Richmond, Virginia

Ms. Nancy Whorton George
Attorney-at-Law
George and George, P.C.
Washington, D.C.

Ms. Mary Clark Webster
Vice President
Governmental Services, Inc.
Portland, Maine

Mr. Fred Van Natta
Executive Vice President
Oregon State Home Builders Association
Salem, Oregon

Mr. Charles R. Ruffing, P.E.
Development Engineer
Engineering Material and Processes Inc.
Pittsburgh, Pennsylvania

Mr. Theodore W. Bryant
Management Consultant
Deloitte, Haskins and Sells
Denver, Colorado

Dr. William L. Atchley
President
Clemson University
Clemson, South Carolina

Mr. I. Samuel Kaminsky
Attorney-at-Law, Partner
Kaminsky, Kelly, Wharton and Thomas
Johnstown, Pennsylvania

Ms. Marilyn S. Kite
Attorney-at-Law
Holland and Hart
Cheyenne, Wyoming

The mission of the Committee is to advise the Secretary of Energy on matters relating to the development of alternative fuels, which includes synthetic fuels. Specifically such matters include the impact of demonstration facilities on communities, states, and Indian tribes; the environmental, health, and safety effects of such facilities; and the means and measures to prevent or mitigate such impacts.

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[1] Public Law 93-577 dated December 31, 1974, amended February 25, 1978 by Public Law 95-238, Alternative Fuels Demonstration Facilities.

Initially, the efforts of this Advisory Committee focused on the Great Plains Coal Gasification Project.[2] Other projects, including Union Oil's Parachute Creek Shale Oil Project and the Cool Water Combined Cycle Coal Gasification Project, have also been explored to better understand the need for, the feasibility of, and the diversified approaches to the development of alternative fuel projects. Specifically, the Committee is interested in the means and measures to mitigate impacts in its areas of prime interest and in the effectiveness of those measures.

To date, the Advisory Committee has met four times: in Bismarck, North Dakota on September 28, 1982; in Washington, D.C. on February 25, 1983; in Grand Junction, Colorado on June 28, 1983 and in Las Vegas, Nevada on October 31, 1983.[3] Three of the meetings afforded opportunities for tours and briefings at the Great Plains, Union Oil, and Cool Water project sites, and one included briefings by senior representatives of the U.S. Synthetic Fuels Corporation on its program. Thus, the Committee has gained firsthand knowledge and a viewpoint on three U.S. active commercial synthetic fuel facilities within the first year of its existence.

Several extensive and lengthy discussions by the Committee members have focused on the various aspects of environmental, health, safety, and socioeconomic approaches to achieving overall success and acceptability of these facilities, including the implications of future

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2 The Advisory Committee was established once the authorities of the P.L. 93-577 were used by the Secretary of Energy to provide financial assistance for an alternative fuels demonstration facility. The Department of Energy was provided obligational authority, direction and guidance on the use of this authority, and subsequently negotiated and awarded a financial assistance contract to the Great Plains Gasification Associates. The Department of Energy has not requested nor been provided new obligational authority for any additional financial assistance awards under the provisions of this Act. Since the Energy Security Act was passed, which provided for establishment of the U.S. Synthetic Fuels Corporation, separate obligational authorities for financial assistance to synthetic fuel projects are now in place.

3 These meetings are open to the public and receive advance notice in the Federal Register. Transcripts of these meetings are available for public inspection in the Department of Energy's Reading Room at the Forrestal Building and at the Library of Congress in Washington, D.C.

broadly based deployment of the industry. The Committee has, therefore, been investigating the various Federal, state, and local approaches toward impact mitigation, looking at these three projects with the objective of determining the applicability of the various approaches to future synfuels acceptability. These investigations are the subject of this report. The conclusions and recommendations presented are offered by the Advisory Committee in keeping with its mission and with a desire to assist government in its ability to make prudent decisions and provide sound policy guidance in this area for the Nation.

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I. INTRODUCTION

Synthetic fuels is certainly a most important and real addition to U.S. energy capability in dealing with liquid fuel shortages, whether the shortage develops gradually or is contrived from abrupt cut-offs of supplies. Synthetic fuels facilities are also important in terms of energy resources availability in that they allow the U.S. to utilize its abundant reserves of solid fossil resources. These resources can be converted into a variety of product forms which are compatible with existing transportation, network, and energy utilization systems which match the broadest market needs. Synthetic fuel processing facilities also offer an inherent environmental protection benefit; that is, a single facility converts the resources to attractive liquid and gaseous forms while simultaneously removing and concentrating pollutants which would otherwise be transported to and released at numerous locations requiring dispersed capture if possible. Although this centralized pollutant capture offers the advantage of focused and hopefully more cost effective mitigation techniques, it also forces the concern of effective mitigation on a few groups of relatively inexperienced government personnel and private project sponsors. The approach to dealing with these unique environmental protection concerns, therefore, becomes an important aspect of overall acceptability of synthetic fuel projects. Thus, information on the effectiveness of various approaches based on early commercial experiences will be of utmost importance to ensure against the possibility of mitigation concerns paling to insignificance in the face of immediate or expedited synthetic fuels development when it is needed.

Environmental protection is a broad issue which encompasses not only the preservation of the biological and physical environment but human health, safety, and socioeconomic factors as well. Much attention has been directed in recent years to gaining information on and the understanding of unregulated or infrequently monitored synfuel substances with potential toxic and carcinogenic effects. Industry liability which can occur in processing, handling, disposing, and emitting of substances with unknown environmental, health, and safety characteristics and effects is well recognized. Similarly, such important issues as water management and socioeconomic impact mitigation are known to contribute to public acceptance of the synthetic fuels industry if handled well.

An issue equally important to environmental, industrial, and public acceptability of the prospective synfuels industry has received much less focus. That is the effectiveness of governmental approaches and involvement as they affect synfuels acceptability. Three commercial synthetic fuel facilities are in advanced stages of construction and operational planning. Each achieved contracts for financial assistance from the U.S. Government under different circumstances and principal legislative authorities. Each has also involved a significantly

different approach in dealing with environmental protection. These approaches are summarized in a case study format which examines the interdependence of actions required by Federal, state, and local governments in reviewing and permitting each project and in implementing a process geared to achieve environmental acceptability. These are presented following a brief synopsis of current governmental involvement in ensuring environmental acceptability of the emerging synfuels industry.

Overview of Governmental Involvement

Currently, Government involvement in synthetic fuels at the Federal level is highly visible due to its role in assisting the private sector in commercializing this industry. Today, three facilities are moving forward with financial assistance from the U.S. Government. The sponsors of the Great Plains Coal Gasification Project (GPCGP), the Great Plains Gasification Associates (GPGA), were awarded a loan guarantee for up to $2.02 billion in January 1982 by the Department of Energy (DOE) under the authority and guidance of the Federal Non-Nuclear Energy Research and Development Act, as amended. This project is monitored by DOE but has also recently applied to the Synthetic Fuels Corporation (SFC) for additional financial assistance in the form of a price guarantee. The sponsor of the Parachute Creek Oil Shale Project, Union Oil of California, was earlier awarded, in July 1981, a price support and purchase commitment by DOE under the authority and guidance of the Defense Production Act as amended by the Energy Security Act. The monitoring of this project was officially transferred from DOE to SFC in February 1982 once SFC was declared fully operational. The sponsors of the Cool Water Combined Cycle Coal Gasification Project, the Cool Water Gasification Program, were awarded $120 million in price guarantees by SFC in July 1983 under the authority and guidance of the Energy Security Act. This project is monitored by SFC. Thus, in a relatively short period of time during which the Federal Government was shifting mission responsibilities, three awards of financial assistance were provided to private sponsors under similar but somewhat different authorities.

The preceding overview of current projects is illustrative of changes in economic and energy conditions reflected by important policy decisions regarding whether, when, and how best to fully deploy synthetic fuels facilities. Inherent in all of these decisions are basic issues such as technology, financing, environmental and product liability, and regulatory compliance. Only the issue of environmental acceptability of synfuels and adequacy of approaches to achieving this is addressed herein.

The environmental, health, safety, and socioeconomic aspects of synthetic fuels development are concerns which must be addressed at all levels of Government from the Congressional and Executive Branches through the local levels where the direct and immediate impacts are felt. Policies set forth at the Presidential and Congressional levels

must be developed with understanding of their implementation through Federal agencies and state and local governmental entities. Monitoring of the effect and effectiveness of these policies in achieving stated objectives is inherent in this process. Where there is limited experience with the implementation of a given policy or directive, such as the need to develop synthetic fuels in an environmentally acceptable manner, monitoring during the initial phases can be a significant factor in decisions affecting future orientation of the policy.

Financial assistance to private developers is currently available through SFC under the authority of the Energy Security Act. This potential financial assistance, along with direct technical assistance and consultation available from other Federal agencies such as DOE and the Environmental Protection Agency (EPA), serves to reduce the overall risks to both synfuel project sponsors and potentially to the nation itself. It encourages the proper implementation of policy objectives by allowing direct oversight and involvement in the early and prototype experiences. In the EHS&S area, this system is expected to have far reaching consequences in removing, alleviating, or better addressing impediments and consequences which have historically plagued other emerging industries.

An overview of involvement by the principal Federal organizations in ensuring environmental acceptability is provided below. A synopsis of interactions with the state and local levels of government is also included to highlight the very important role these organizations must play both in the near and long-term in achieving acceptability of the industry.

Synthetic Fuels Corporation

SFC has a critical responsibility to ensure that the synthetic fuels industry is developed "in a manner consistent with the protection of the environment."[4] SFC was also given authority over the Environmental Monitoring Plans of the projects it finances.[5] SFC may use its power of the purse and its approval authority to ensure that project sponsors develop and implement sound and comprehensive monitoring programs which will: (1) help to identify and characterize the environmental and health problems associated with their ventures; and (2) develop an information base for the mitigation of problems associated with the replication of synthetic fuel projects. Environmental Monitoring Plan Guidelines have been developed by SFC to help project sponsors in preparing and implementing acceptable programs. The programs are to be

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[4] P.L. 96-294, Section 100(a)(3) and (b)(2)(B).

[5] P.L. 96-294, Section 131(e).

comprehensive, covering all aspects of concern except water management and socioeconomic impact mitigation.[6] Project sponsors and SFC consult with DOE, EPA, and the state in which the project is to be located to ensure that the best available expertise on the relevant matters is taken into account in these programs. In turn, DOE affords opportunities and receives input where appropriate from other Federal agencies, such as the National Institute of Occupational Safety and Health and the Department of Interior (DOI) so that other Federal expertise can be combined with that of DOE to provide project sponsors and SFC more comprehensive consultation.

The environmental monitoring programs are given the full weight and force of the financial assistance agreement. Provisions for data collection and regular and frequent oversight are provided. Continuing involvement of the consulting agencies is also provided for through Monitoring Review Committees. Regulatory compliance and beyond-compliance activities are the fundamental aspects of these programs. Ideally, they are designed to capture the lessons to be learned from these early commercial experiences and ensure that the information is available to the organizations with research and technology development, impact mitigation, regulatory, decisionmaking and national policy responsibilities, and who have roles in identifying and controlling the environmental effects of synthetic fuels projects.

Regulatory Agencies

Currently, the known environmental and health effects of synthetic fuels projects are regulated through the permitting process -- a joint partnership between Federal and state agencies. EPA, which has a statutory responsibility to set environmental protection standards for emerging energy technologies, and the Occupational Safety and Health Administration (OSHA), which has statutory responsibility to set worker safety standards for industries, have delegated much of their permit responsibility to states with an approved plan which is equal to or more stringent than Federal standards but retain an oversight/reviewing role. EPA provides technical assistance and funding through grants to state agencies responsible for issuing various permits to the sponsors of synthetic fuels projects. OSHA also provides funding to the states for permitting, review and other regulatory activities.

In the application of major Federal environmental, health and safety statutes to synthetic fuels facilities, two factors stand out as important in specific regulatory application:

1) The synfuels industry is the only major new industry to begin its commercial development after the enactment of these statutes.

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[6] These are to be covered under separate terms of the financial assistance agreements.

2) It is difficult to write detailed and workable regulations for technologies still in their infancy. Most of the environmental, health and safety laws require the setting of standards based on extensive review of actual operating experience. Such commercial operating experience simply does not exist for most synfuel technologies.

Because of these factors case-by-case permitting decisions have become the major means by which environmental, health and safety controls for compliance activities are being established. EPA has, however, published guidance and reference manuals to assist state regulators. These publications attempt to capture results of industry and governmental research related to the health and environmental effects of synfuels as well as document state-of-the-art technologies for control of emissions and effluents.[7]

Department of Energy

DOE and its predecessor agencies, with coordinated research support in certain areas from EPA, have been involved in a variety of ways with the environmental acceptability of emerging energy technologies including synthetic fuels. Although this agency's mission is currently geared towards long-range, high risk, potentially high payoff research and development in energy (which includes research to improve the environmental, health and safety understanding of synthetic fuel processing), there was recently a time when DOE was more directly involved in the actual development and demonstration of synthetic fuels technologies for relatively large-scale plants. This earlier involvement took the form of commercial project feasibility studies, major demonstration projects and major pilot plant's to examine and test promising new technologies, and working with industry on a cost-shared basis to commercialize these technologies. These earlier efforts included governmental opportunities for industrial repayment through profit sharing and sale of completed, successful plants and technology rights.

Under the Federal Non-Nuclear Energy Research and Development Act (and at one time under the Defense Production Act, as amended by the Energy Security Act), DOE had the authority to provide financial assistance such as loan guarantees to synthetic fuel projects for the purpose of demonstrating commercial technology while ensuring and monitoring environmental acceptability. DOE has also been directly involved in energy impact assistance and consolidated permit process development through planning grants to state and local governments.

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[7] The most notable of these publications include a series of technology specific "Synthetic Fuel Pollution Control Technical Manuals" which came out in April 1983 and the "Environmental Monitoring Reference Manual for Synthetic Fuels Facilities" which came out in July 1983.

These efforts have aided in the streamlining of environmental permitting processes as well as in planning for socioeconomic impacts and mitigation for energy development. In addition, DOE conducts a large technology transfer program.

Specific examples of these governmental organizations' current involvement in developing synfuels and the application of their approaches to ensuring environmental acceptability of this emerging industry are provided in the case studies which follow.

II. CASE STUDY #1: GREAT PLAINS COAL GASIFICATION PROJECT MERCER COUNTY, NORTH DAKOTA

Several special features of the Great Plains Project which were designed and are being implemented to ensure environmental acceptability are the result of an unusual combination of interactions between the project sponsors, GPGA, and participating governmental organizations (DOE, DOI, State of North Dakota, and Mercer County). The circumstances surrounding this project offer a unique viewpoint into the approaches and subsequent activities associated with its permitting, financing, environmental impact, and socioeconomic impact mitigation.

Many of this project's special features are directly attributable to its financing under the authority of the Federal Non-Nuclear Energy Research and Development Act. Because of this, these features may not be directly comparable to those required for future projects which are to be financed under the Energy Security Act. However, it is noted that this project and its requirements were examined by SFC both directly and indirectly, and with DOE's consultation, as SFC developed its programs. Although the authorities contained in the laws are different in many respects, it is apparent that the Great Plains Project was the prototype by which SFC modeled many of its current activities, especially regarding the supplemental environmental and health monitoring requirements described herein. It may be, that without explicit legislative guidance, other unique examples derived from this project, such as energy impact mitigation and special provisions for American Indian employment opportunities, will not be pursued.

Background of the GPCGP

The Great Plains Coal Gasification Project (GPCGP) is the first commercial-scale high-Btu coal gasification plant in the nation. It is now under construction in Mercer County, North Dakota, near the town of Beulah and is proceeding on schedule and within budget. Production is anticipated to begin in late 1984. The GPCGP is being constructed with the aid of a Federal loan, guaranteed by DOE, for up to $2.02 billion. The equity investment pledged by the partners is up to $740 million. Also, GPGA has recently applied to SFC for price guarantees based on 1983 National Energy Policy Plan (NEPP IV) energy price forecasts.[8]

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[8] Title VIII of the Department of Energy Organization Act of 1977 requires that the President prepare and submit to Congress biennially a National Energy Policy Plan (NEPP) and that the views and proposals of all segments of the economy be taken into account in the preparation and formulation of the Plan. The fourth report (NEPP IV) was officially published in October 1983. However, drafts were available as early as January 1983.

The project will use abundant and easily mined local lignite to produce 137.5 MMCF of high-Btu gas (22,000 bpd oil equivalent). The gas will be commingled with natural gas and sold to customers in the Midwest and Eastern U.S. Both mining and conversion operations are conducted by GPGA, and their affiliates. ANG Coal Gasification Company (ANG) is the project administrator and Coteau Properties Company operates the mine. The project consists of a lignite surface mine, a gasification plant, and a pipeline connecting the plant to an interstate pipeline network.

DOE Involvement

In August 1981, DOE issued GPGA a conditional commitment for a $2.02 billion loan guarantee. Site preparation had begun in July 1980 and construction started in September 1981. By mid-December negotiations on the issues had been completed. The loan was closed in January 1982. A Monitoring Agreement, which addresses a Project Management Plan (which includes a section identified as the Environmental Monitoring Plan),[9] is the mechanism by which DOE tracks compliance of the project with the conditions of the contract. Among other things, the Monitoring Agreement requires submission of monthly and other periodic reports and permits DOE and other parties designated by the Secretary of Energy access to the site and to non-public data located in a "safehouse."

Supplemental Environmental Program

The Monitoring Agreement was negotiated to address concerns that are "supplemental" to regulatory requirements and the approved Environmental Monitoring Plan (EMP). The EMP makes all necessary environmental compliance measures and some voluntary mitigation activities part of the basic agreement. Additionally, the project is responsible for performing and reporting on certain "supplemental" environmental activities, as designated by DOE, for the purpose of demonstrating the environmental and health acceptability of the facility and future plants, thereby assuring plant replicability. A $12 million budget allocation for these activities was also required by DOE. The scope of activities which may be required include:

- testing of pollution controls;
- ambient air studies of organic pollutants;
- an annual prospective epidemiology study for all employees;
- toxicity screening tests;

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[9] The Monitoring Agreement is Exhibit E of the Loan Guarantee Agreement dated January 29, 1982. It incorporates by reference the approved Project Management Plan dated November 1981 (revised January 1982). Section 6, Volume I, of the Project Management Plan is the approved Environmental Monitoring Plan.

- quarterly water quality studies; and
- trace element determinations.

By mutual agreement of the parties, other tests may be substituted in lieu of the above. DOE formulated and proposed a program plan for the supplemental requirements in October 1983. This Supplemental Environmental Program (SEP) Plan was developed in three stages which included the establishment of a steering committee and five subcommittees and involved not only ANG but coordination with other Federal, state and local agencies as well. Once the SEP was reviewed and approved internally in DOE, it was transmitted to ANG for comment. ANG and DOE have essentially agreed upon the plan which will be submitted to GPGA for adoption and implementation. Because GPGA also agreed voluntarily to several beyond-compliance environmental activities in their EMP, it is expected that these collective efforts will go far in the development of a data base which can be used to reduce uncertainty concerning environmental issues and thereby preclude over-regulation or unnecessary controversy to the development of this technology and ultimately, the synfuels industry.

Energy Development Board

Once it became apparent that the project was viable and industry studies had defined the magnitude of economic impact to the project area, DOE initiated development of an Energy Development Board (EDB) to plan for energy-related growth in Mercer County and to ensure mitigation of socioeconomic impacts. The EDB was funded by DOE from 1977 to June 1981, through a grant to the county.[10]

The stated objectives of the Mercer County EDB were to improve the quality of community development (that is, to mitigate the impact of energy development facilities) and to promote energy conservation and the efficient use of energy resources. The latter objective arose because the original DOE funding was provided by the Office of Building and Community Systems, a part of DOE, and this objective in fact received effective attention from the EDB. The greater concern of the communities of Mercer County was with socioeconomic mitigation.

The EDB consisted of the three county commissioners, representatives from the municipal governments, and representatives from the school districts all of whom served voluntarily. It had a full-time staff, paid for by the DOE grant, without which observers of the process

[10] The EDB was a "joint powers board," authorized under state law but with no legal authority to assemble or develop land, promulgate statutes, receive and distribute tax or grant funds, or otherwise act in any but an advisory, planning, and monitoring capacity. Counties and municipalities in North Dakota for which a joint board has been established may incur indebtedness against anticipated coal severance taxes to the extent approved by the State Energy Development Impact Office (EIDO).

have said it could not have functioned. The EDB planned for continuing socioeconomic impact mitigation through use of the direct county share of coal extraction and conversion taxes. Between 1975 and the end of 1982, Mercer County received a total of $29.5 million in grants from the state coal tax fund and $5 million in loans from a coal tax trust fund. By 1987, it is projected that the county will receive $8 million annually in tax share, $3 million of which is from the tax on the GPCGP.

GPGA was not required to participate in the EDB since the board was concerned with the expenditure of public funds and had no power to require industry contribution. However, GPGA voluntarily funded some EDB activities and also took on builder mortgage obligations when it became difficult to get money to build the necessary housing for new workers.

The net effect of the efforts of the EDB is that Mercer County has experienced positive socioeconomic change as a result of the establishment there of the GPCGP. The availability of discretionary tax money to pay for socioeconomic impact mitigation at the local level permitted application of funds to meet real needs and to satisfy vital local concerns. Substandard application of funds was minimized by DOE's assistance which permitted a well-staffed EDB to recommend mitigation measures.

GPGA also responded voluntarily in Mercer County with formation of the Inter-Industry Technical Assistance Team (ITAT), composed of representatives of GPGA and other Mercer County energy companies. The ITAT is designed to contribute expertise and advice to the local planning process and is still in existence. It is the source of data on numbers of workers, numbers of trucks, tax revenue projected in the future, volumes of waste, needs for roadways and other infrastructure, and other important information for the county planning process. In addition, DOE established a requirement in its loan guarantee contract with GPGA that GPGA would assure that ITAT continued its contribution to the local planning process even if other energy companies ceased their membership and participation.

In summary, DOE's involvement with the Great Plains project has allowed for both increased potential for this project's environmental acceptability (and derived benefits for future projects) and increased public acceptance of the project and its role in the community and county.

State of North Dakota Involvement

There is no central coordination agency or permitting agency in North Dakota. Permitting involves a variety of state and county agencies and is concerned with the preservation and proper use of the state's major assets: water, immense lignite deposits, prime farmland,

and relatively clean air. Water management and preservation of special areas are the only resources subject to unique regulation. For protection of these resources, North Dakota has designated certain exclusion and avoidance areas for energy conversion plants or supporting activities (such as water diversion or power lines). Prime farmland, for example, is classed as an avoidance area in most cases. However, special exceptions can be made as in the case of the GPCGP.

From the standpoint of state permitting and regulation, the site chosen for the project in west central North Dakota posed no particular problems. Adequate water was available in nearby Lake Sakakawea and water rights were secured early. The amount of prime farmland to be permanently removed from production, 1,100 acres, is relatively small and will not significantly affect the total agricultural output of Mercer County. Land restoration after surface mining has been carried out in the area for several years, so that several methods were available to satisfy those regulatory concerns.

The GPCGP applied for its first necessary permit, to appropriate and use water for the project, in February 1973. A conditional water permit was granted in February 1974 by the North Dakota State Water Commission for 17,000 acre feet of water to be drawn from Lake Sakakawea. Subsequently, GPGA was required to enter into a 40-year marketing agreement with the Department of Interior, Bureau of Reclamation (Upper Missouri Region), to supply these water requirements. The Agreement includes the adjacent power plant's needs and was signed in October 1979. A unique provision is included under this Water Service Agreement. Indians are given preference in hiring for the project and notices of job opportunities are posted at the Fort Berthold Reservation (located adjacent to Lake Sakakawea) forty-eight hours prior to general posting. As a result, the Great Plains participants have made a special effort to hire members of the local Indian tribes to work on the project. This effort has so far been more successful in the construction phase than in the hiring of potential operating personnel.

Approval to construct an energy plant in North Dakota lies with the State Public Service Commission (PSC). The PSC usually requires that all applicable Federal, state and county permits be obtained prior to final PSC approval.[11] However, the PSC issued its Certificate of Site and Corridor Compatibility for the project in November 1977. This was followed by receipt of the Air Pollution Control Permit to Construct in

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[11] The Public Service Commission also may attach conditions to its approval. For example, it included in the GPCGP site compatibility certificate certain conditions requested by Mercer County. These conditions required GPGA to provide security and emergency medical facilities at the project, to repair damaged roadways and construct on-ramps, and cooperate with county and municipal authorities to solve socioeconomic problems.

January 1978, Mercer County's Certificate of Zoning Compliance in March 1980, issuance of the Final Environmental Impact Statement in August 1980, and granting of NPDES permits in December 1981. Table I illustrates these and other major events associated with the project and its permitting activities.

A unique feature of North Dakota law which affects synthetic fuel development is the state's tax policies. For mitigation of adverse economic impacts, North Dakota primarily relies on the collection and distribution of taxes. Coal resource utilization is taxed in two ways: (1) a coal extraction tax; and (2) a coal conversion tax for that coal not sold after mining but converted directly. A large percentage of these coal taxes are returned to the county to be used for infrastructure and other community needs occasioned by the rapid buildup of population in the largely rural communities of North Dakota.[12] The North Dakota Energy Development Impact Office (EDIO), established in 1977, has responsibility for distribution of grants and loans from a portion of this tax fund.

To date, Mercer County is the primary beneficiary in North Dakota from State Coal Conversion and Coal Extraction taxes. Low interest loans were made by the state, payable from allocations of future coal utilization taxes; in addition, the county was given state grants from a fund which will be reimbursed from future taxes. Because of these factors there was no need to impose an up-front contribution on the GPCGP, thus permitting GPGA's entire socioeconomic mitigation contribution (conversion and extraction taxes) to be operating cost rather than capital expense. Since there was an oversight office (the EDIO) with final approval responsibility for loans and grants, unwise expenditures by local jurisdictions could be prevented. Additionally, the existence of the EDB provided a mechanism for careful planning.

Mercer County Involvement

Mercer County's principal involvement in the GPCGP is in the steps taken to resolve the social and economic problems attendant upon establishment of the synfuels plant in this rural area. Coal conversion and extraction taxes returned by the state, loans and grants from the State EDIO, and the DOE-sponsored EDB combined to provide a scenario in which the negative impacts of this project can be overcome while allowing the project's acceptance by the public at the local level.

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[12] Coal conversion is taxed at a rate of 0.25 mils per Kwh and 2.5% of the gross revenues for gas production. Coal extraction is taxed at $0.85 per wet ton. Taxes are collected on other resources within the state as well. In practice, the affected jurisdiction surveys its needs and forecasts its requirements, then applies to the North Dakota Energy Development Impact Office for loan or grant funds to mitigate the perceived impacts. Under the formula, 20% of severance revenues go to the county and its municipalities and school districts.

TABLE I

GREAT PLAINS COAL GASIFICATION PROJECT
CHRONOLOGY OF MAJOR EVENTS

May 1972	Michigan Wisconsin Pipe Line Company, an American Natural Resources subsidiary, and North American Coal Corporation sign an agreement providing North American the right to mine 1.5 billion tons of coal.
February 1973	Water rights for 17,000 acre feet per year of water for coal gasification applied for.
February 1974	Michigan Wisconsin granted a conditional water permit by North Dakota State Water Commission for 17,000 acre feet of water to be drawn from Lake Sakakawea.
March 1974	An office is opened in Bismarck, North Dakota, to handle the coal gasification plant field requirements.
May 1976	ANG files application for a certificate of Site Compatibility with the North Dakota Public Service Commission.
April 1977	Mercer County Board of Commissioners grants zoning approval of conditional use.
August 1977	Energy Development Board (EDB) established.
November 1977	North Dakota Public Service Commission issues certificates of Site and Corridor Compatibility.
January 1978	Air Pollution Control Permit to Construct the facility obtained from the North Dakota State Department of Health.
April 1978	North Dakota Public Service Commission designates EDB as socioeconomic monitoring agency for Mercer County.
June 1979	Hazen city commission approves growth management plan developed by EDB.
October 1979	U.S. Bureau of Reclamation enters into 40-year marketing agreement with ANG Coal Gasification Company to supply water requirements from Lake Sakakawea.
January 1980	NPDES permit application filed.
March 1980	Mercer County Board of Commissioners issues a certificate of zoning compliance granting final zoning authorization for construction of the facility.

TABLE I (Cont'd.)

GREAT PLAINS COAL GASIFICATION PROJECT
CHRONOLOGY OF MAJOR EVENTS

July 1980	Site preparation begins.
August 1980	Final Environmental Impact Statement completed.
June 1981	DOE/EDB Agreement expires; EDB closes.
August 1981	Issuance of conditional commitment for loan guarantee to GPGA by DOE.
September 1981	Construction begins.
November 1981	Environmental Monitoring Plan adopted as part of Project Management Plan.
December 1981	NPDES permits granted.
January 1982	The Department of Energy and Great Plains officials sign all documents necessary for the issuance of a Federal loan guarantee of up to $2.02 billion to finance the debt portion of the project.
March 1983	Partners indicate projected cash flow shortfalls, preventing return of their contributed equity within ten years as stipulated in the Partners Consent and Agreement.
August 1983	Draft Supplemental Environmental Program Plan (SEP) submitted to DOE Headquarters by CHO.
September 1983	GPGA submits unsolicited application for price guarantee to SFC.
October 1983	DOE's proposed SEP submitted to ANG for review and comment.
November 1983	Start-up of plant scheduled to begin.
January 1984	SFC releases targeted solicitation for coal or lignite gasification projects to which GPGA responded, requesting a price guarantee.
December 1984	Full gas production scheduled.
1988	Begin loan payback.
2001	Liquidate loan.

With regard to the EDIO loans, it is up to the jurisdictions to budget around the projected revenue figures and to manage their use of funds to accommodate any shortfall. Loan repayment must be included in the local budgets, although in the event of project failure the loans will be forgiven. For example, if the GPCGP were suddenly to shut down and disappear, Mercer County would be left with a large new infrastructure to support, a dwindling population, and no resources with which to deal with the problems. However, the localities would not be liable for indebtedness incurred from the EDIO loans. This scenario appears unlikely but does serve to point out what the county can expect to deal with should this situation occur.

There is no apparent requirement for early or direct notification to the county regarding potential termination of the project. However, DOE's Loan Guarantee Agreement with GPGA includes provisions which require GPGA to officially notify the Secretary of Energy of contemplated termination and, in general, to notify the Secretary when conditions arise that would permit GPGA, in its view, to terminate. Since DOE and GPGA have generally shared information on such situations with Congress, the press, and other interested parties, the county,in this case, has been kept informed on such developments.

Grants, loan funds, extraction and conversion taxes, and increased property taxes resulting from the GPCGP actually constituted a windfall for Mercer County. In addition, efforts attributed to the EDB to spend the money wisely are promising. Budgets based on conservative estimates of tax revenues have not been exceeded; immediate problems, such as school construction have been taken care of; emergencies, such as housing construction in the face of an unfavorable mortgage market, have been alleviated by industry cooperation; trailers and temporary housing for single workers will be removed once construction is completed; efforts are underway to utilize coal gasification by-products to create off-shoot business; and it is unlikely that the towns in Mercer County will be left with desolate, unoccupied shanty-towns once the construction boom is past. Further, Mercer County was particularly successful in coordinating efforts of the several affected municipalities and school districts.

The major communities in Mercer County are Beulah and Hazen with populations, before the project began, of 2,900 and 2,400 respectively. Before the GPCGP, total Mercer County population was about 10,000; the project, directly and indirectly, will cause that population to increase permanently to more than 15,000. Short-term impact of construction personnel influx will be greater. Figure 1 is a map of Mercer County showing the GPCGP and other existing or proposed energy projects associated with the county's lignite deposits.

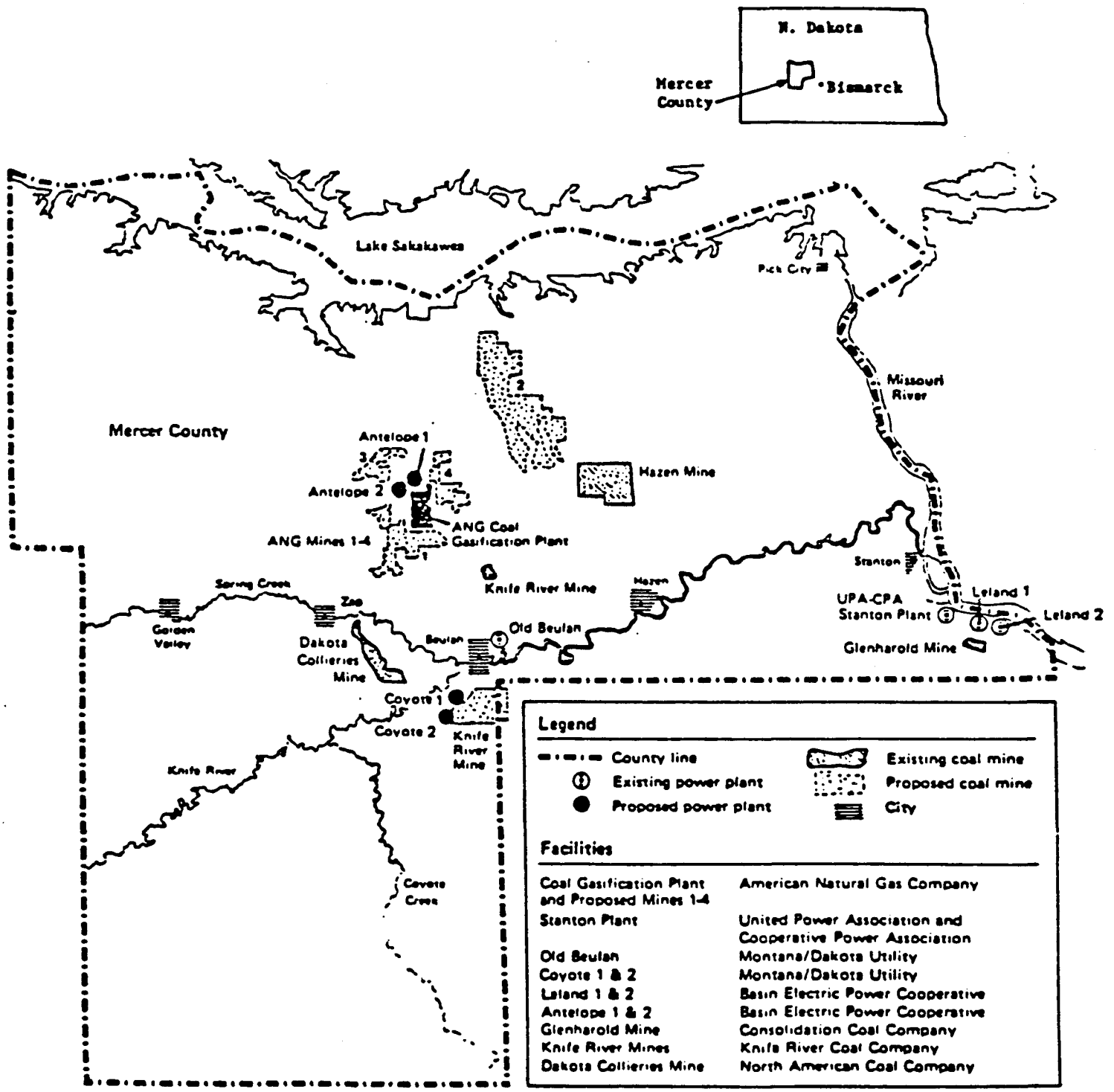

Figure 1. Established and Proposed Energy Projects in Mercer County, North Dakota

The Basin Electric Plant (Antelope 1) and the Great Plains Gasification Project (GPCGP), including the four mines, constitute a single industrial entity. The Basin Electric Plant is a coal (lignite) fired electric generating station. American Natural Gas Company (ANG) is the operator of the GPCGP.

Analysis of Case Study Features

DOE's financial assistance contract with GPGA provides a unique vehicle through which supplemental environmental, health, safety and socioeconomic data may be obtained. This type of information is clearly needed from the early synfuel commercial experiences to increase the ability of responsible policy and regulatory agencies at both the Federal and state levels to impose realistic and not overly burdensome regulations or requirements on future plants. An extended benefit from DOE's supplemental requirements for this project is the role that the effort played as a model which SFC could and did study in designing its environmental monitoring requirements. Having little to no other experience in this area to fall back on, the GPCGP is clearly the prototype experience in ensuring future environmental acceptability of synfuels.

Developers of synfuels projects will be expected to assist rural and semirural areas and nearby communities in dealing with the resulting need for increased community facilities and services. The EDB approach sponsored by DOE provides a well documented model which may be considered when socioeconomically impacted rural communities face new energy development. This approach, combined with North Dakota's use of coal utilization taxes to provide funds for prospective or actual economic impact mitigation, has had a definite positive benefit in promoting the acceptability of the GPCGP. However, it is recognized that this approach could become controversial in some circumstances; e.g., where the state channels investments to counties facing new development rather than to counties with established energy developments which may need help. Thus, some part of the success of the application of this approach necessarily depends on the source of the tax revenues and the willingness of the state to distribute money fairly for needed community development.

Another aspect of the EDB approach which should be considered is the county's willingness to add to their overhead cost such a planning and public participation function. The EDB was entirely supported by DOE, and once this funding ceased so did the EDB. It is unclear whether the advantages of this approach would outweigh the disadvantages to counties where there was no funding to support this function.

The approach used by the State of North Dakota in its regulation and permitting procedures is typical of most states. A developer deals directly with responsible state organizations in negotiating individual permits and approvals. Siting is a major issue in North Dakota which must be addressed with the state's Public Service Commission (PSC). Because the PSC may attach conditions suitable to the impact mitigation needs of the affected county, as was the case with the GPCGP, the approval process can add additional "insurance" and oversight by the state to see that the needs of the county are met. The North Dakota

approach also allows negotiation between the project sponsors and the state, either directly or indirectly, through its elected representatives. Thus, this aspect implies substantial freedom in considering the public's views on the development.

Finally, a particular situation exists in this project involving the Water Service Agreement entered into with the Bureau of Reclamation to supply the water requirements of the plant, and the provision of hiring preference for Indians at the Fort Berthold Reservation. Clearly, whenever the opportunity exists to support the participation of human and natural resources of Indian Nations in the U.S. Government's synthetic fuels program is of importance, as are the traditional opportunities supported by the Government for small businesses and firms owned by minorities and women. Assurance that these opportunities continue to be available on a priority basis is a worthwhile consideration in the overall acceptability and public perception of large investments, such as the synthetic fuels program, which the Government supports. This is especially true in the west where a large natural resource potential for synthetic fuels is located on or is in close proximity to Indian Territories.

The precise set of development and support circumstances shaping the process used here will probably never come together again in the same fashion. However, the successes and difficulties of this process undoubtedly influenced and will continue to influence the development and shaping of the successors' approaches at the Federal, state, and local levels of government.

III. CASE STUDY #2: UNION OIL PARACHUTE CREEK SHALE OIL PROGRAM GARFIELD COUNTY, COLORADO

DOE entered into a financial assistance agreement with Union Oil Company of California for the Parachute Creek Oil Shale Project in Garfield County under the authority of the Defense Production Act. At about the same time, DOE also made an award under this Act for the Colony Oil Shale Project, also in Garfield County. These contracts were developed and awarded by DOE earlier than the contract for the Great Plains Project. They differ materially from it primarily due to the substance and requirements of the authorizing legislation. Both of these oil shale projects were transferred to SFC when it became operational but retained the terms of their respective contracts. Although the Colony Project has been indefinitely postponed, the Union Project remains active. Union has also received a letter of intent for additional financial assistance for Phase II of the project, under the authority of the Energy Security Act.

Special provisions of the present Union agreement which are of interest here include significant and specific financial obligations to alleviate the socioeconomic impacts of the energy facility, and conditions whereby sampling of environmentally important streams may take place to improve the knowledge base of pollutants which are of environmental, health or safety concern. Potentially more significant features of this project, however, stem from its Phase II potential rather than from existing Phase I activities. Should the project receive additional financial assistance for Phase II from SFC, the perhaps unusual case of one project's authorization coming under two separate and distinct laws would become a reality.[13] In particular, Union would be required to prepare an Environmental Monitoring Plan in accordance with the Energy Security Act.

Because Union is now limited by EPA in their ability to produce the additional volume of product of Phase II, it is apparent that convincing data must come forth as to the environmental acceptability of the process or appropriate mitigation techniques developed. Another significant aspect of the expanded operation is the project's relation to the state and local government and the initial application of two new approaches to permitting a synthetic fuel facility. These are the Colorado Joint Review Process and Garfield County's Master Permit Plan. Certainly, if this project goes forward with the additional SFC support, many potentially important commercial experiences will be available and well documented.

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[13] The only other potential instance of this occurring would be if GPGA is awarded the price guarantee they are currently requesting from SFC.

Project Background

The Parachute Creek Shale Oil Program is an outgrowth of continuing small-scale and pilot plant shale oil operations on the part of Union Oil over the past 40 years. The result is a project whereby the shale is mined, retorted on a shelf adjacent to the mine, and the resulting product (kerogen) transported to a nearby refinery for upgrading to a high-quality light crude, similar at that point to diesel fuel. The present project (Phase I) is administered by SFC and receiving Federal financial assistance in the form of a price guarantee and purchase agreement negotiated by DOE. Phase I will produce 10,000 barrels of upgraded syncrude per day. Modular development is planned to eventually produce 90,000 barrels daily of diesel fuel and aircraft fuel. The Department of Defense has first rights through the purchase agreement to acquire fuel supplies related to Union's Phase I production capacity. Phase I start-up began in late 1983, but encountered some difficulties. Production remains scheduled for 1984. Union also applied to SFC for financial assistance under two different solicitations in preparation for Phase II of the development, and has now received a letter of intent for up to $2.7 billion in price guarantees for the expansion effort.

DOE Involvement

The price guarantee which Union negotiated and signed with DOE and which was subsequently transferred to SFC contains some unique features important to overall environmental acceptability of the project as well as to replication. For example, SFC (previously DOE) has the right to take samples (or have sampled) any product or waste stream, emission source, or waste material resulting from the process. This data may be used to assess aspects crucial to ensuring future acceptability of above-ground shale retorting projects.[14] Additionally, valuable information concerning revegetation and other unique aspects of spent shale disposal is to be obtained through provisions of the Mined Land Reclamation Permit which requires annual research and reporting on successful methodologies. This provision of the permit is specifically called out in the contract adding legal weight to the state requirement.

Under the terms of the contract, Union agreed to several commitments and obligations to alleviate the socioeconomic impact of the project on Garfield County. These conditions provide for Union's involvement in an industry-wide socioeconomic monitoring program and requires impact mitigation financial commitments. These commitments include such activities as front-end financing, participation in the Cumulative Impacts Task Force, and several specific conditions ranging from upgrading a major road to providing emergency medical services to Parachute. These obligations have resulted in almost $63 million worth of expenditures by Union to date (see Table II).

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[14] It is unclear at this writing whether or not SFC will exercise this option although DOE has clearly indicated to SFC its desire to pursue sample collection and subsequent characterization and analysis.

TABLE II

UNION OIL COMPANY OF CALIFORNIA

Parachute Creek Shale Oil Program

Community Impact Mitigation

*Single Status Housing to minimize number of employees in community)		$24,800,000
*Housing for Construction and Permanent Employees		24,132,000
Direct Assistance to Communities		13,080,197
Parachute bypass	$ 500,000	
Upgrade County Road 215	7,400,000	
Parachute law enforcement	129,143	
Parachute administration	26,667	
Parachute emergency medical services	6,667	
Parachute middle school	4,200,000	
Parachute fire hall architectural services	3,000	
Parachute town hall and fire hall property	136,000	
Parachute park land	150,000	
Rifle City Engineer	20,000	
Rifle bypass	93,000	
Grand Valley fire district truck	72,000	
Garfield County sheriff's department	251,270	
Garfield County solid waste study	25,000	
Garfield County human services	31,450	
Air Methods - emergency helicopter	36,000	
Other		864,705
Cumulative Impacts Task Force	14,705	
Parachute water and sewer tap fees	600,000	
Parachute annexation fees	250,000	
Total Impact Mitigation Costs		$62,876,902

*Both of these investments will be recovered by collection of rents and mortgage loans.

In 1978, the Colorado Department of Natural Resources (DNR) received a grant from DOE to develop an intergovernmental review process for major energy and mineral development projects. The objectives of the process were to:

- provide the State of Colorado with a mechanism to coordinate government actions (such as regulatory reviews associated with major energy and mineral resource developments) between the national, state, and local levels of government;
- serve as a model for possible use by other states; and
- provide the public and special interest groups with more structured opportunities to participate in governmental reviews of major energy and mineral resources projects.

At the time of Union's Phase I permitting, the Joint Review Process (JRP), as it came to be known, had not been tested on any project. The alternative or historical approach to permitting (i.e., dealing independently with the various organizations) was therefore followed. Because the JRP process is entirely voluntary, Union is not required to use it but, in fact, did initiate a request to participate in the process for its Phase II permitting. It is anticipated that the JRP will facilitate Union's efforts to comply with the lengthy and often duplicative requirements of the various regulatory agencies.

A major feature of the JRP is that public participation is ensured in a structured manner at very early stages, permitting early identification of questions and problems.[15] These early events also provide for increased coordination between state and local agencies because local issues are raised earlier. Working relationships between the project sponsor and Federal, state, and local agencies are also improved regarding regulatory requirements as it encourages dialogues between the various involved parties.

Garfield County is now in the process of developing a Master Permit process, with assistance indirectly from DOE, which will consolidate the more than 20 separate permitting actions now required. A single permit will be issued, complying with all county statutes and requirements. It is expected that Union will benefit from this "one-stop" permit process regardless of the stage of formal final definition of the process by the county. Union's Phase II operation may be the initial test case for application of the new process.

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[15] Under typical regulatory processes, the majority of public hearings occur toward the end of the negotiation cycle with the various agencies; under the JRP, there are many hearings preceeding the agency decision stage. Under either system, the opportunity for judicial address exists for any part or all of the permitting process.

In summary, DOE's involvement in the Union project, both directly and indirectly, has been significant. Directly, DOE has provided a suitable vehicle for SFC to pursue several important aspects of the project's environmental acceptability. Indirectly, DOE's earlier financial assistance to the state and subsequently to Garfield County provided unique opportunities for alternative approaches to synfuels development in Colorado.

EPA Involvement

Under Section 5 of the Toxic Substances Control Act (TSCA), manufacturers must provide a Premanufacture Notice (PMN) to EPA before manufacturing a new chemical substance for commercial purposes. Union Oil submitted to EPA the first PMN for new synthetic fuels. As a result of the submittal, which included considerable chemistry and health and environmental effects data on Union's products and comparable petroleum, EPA is allowing Union to undertake limited production (approximately 12,000 barrels per day) of the synthetic crude oil, providing Union supplies EPA with additional chemical and toxicological data.

EPA's action came in the form of a binding consent order in May 1983. The order requires Union to use special worker protection equipment during certain potentially hazardous operations and to treat certain process wastes as hazardous until EPA has sufficient information to evaluate them. Union's required submissions include chemical analyses of the commercial syncrude, the results of chronic health effects tests, and the results of acute and chronic aquatic toxicity tests. These activities will also address the similarity of the commercial syncrude to the tested pilot samples, the chronic effects of the syncrude and its derived products, potential risk to workers at the upgrading plant, and potential risk associated with process waste from the upgrading plant.

EPA has also arranged to cooperate with the Colorado State authorities charged with evaluating and controlling the waste shale disposal pile. EPA intends to contribute its technical expertise to assist the state in the development of adequate research and monitoring plans for the continuing evaluation of waste shale disposal.

SFC Involvement

As noted earlier, the Union (Phase I) contract was transferred to SFC from DOE, once SFC became operational. After withdrawal of the Colony Project, Union was the only continuing project at SFC for some time. Thus, SFC's involvement in the project is necessarily unique. Because SFC is pursuing its own directions and approaches to contracting and environmental requirements, the environmental sampling and some reporting activities permissible under the Union Phase I contract may not be vigorously pursued by SFC. This possibility could be understandable since these activities would apparently require direct

additional funding by the Federal Government and involves basic and applied research outside of SFC's perceived mission for its projects, as well as its management and performance expertise. Additionally, SFC can find consolation in the fact that the state has indicated it will require certain of these testing and information activities through its permit conditions.

If Union proceeds with Phase II with assistance from SFC, Union would submit an Environmental Monitoring Plan (EMP). Because Union has indicated they will not proceed with Phase II without such assistance, the expansion effort will likely contribute significantly to the capture of environmental lessons through the EMP process. Union would be required, in this case, to commit to certain "supplemental" monitoring activities after consultation with DOE, EPA, and the state. This effort would allow new opportunities for ensuring future environmental acceptability of synfuels. An EMP Outline was submitted by Union to SFC and the consulting agencies in January 1984. This submission is currently under review in accordance with SFC's EMP Guidelines.

Colorado State Involvement

Colorado law is well formulated with respect to environmental, health, and safety considerations for mining in general and shale mining in particular. Spent shale disposal, land reconstitution, water use, groundwater contamination, and so on are covered in detail and by specific permits and regulations. Compliance standards are well spelled out in Colorado but there are similar or (less often) conflicting provisions in the different statutes. Where those statutes are administered by the same agency, negotiation is straightforward, but, as Union experienced, where more than one agency is involved, it is up to industry to carry the burden of reconciling the differences or of avoiding multiple satisfactions of the same requirement.[16] Even though the process took only three years (in Colorado, permitting for a major shale project may require four years), Union Oil felt that the process was sufficiently uncoordinated that the company would benefit from participation in the JRP for Phase II.[17] Table III is a chronology of major events in the Phase I process and in beginning actions for Phase II.

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[16] There are 30 or more separate agencies or subagencies in the state with which a mining or energy project must deal, and Garfield County had in place more than 20 separate permits and certifications at the time of Union's Phase I application.

[17] Union Oil's Phase II negotiations under the JRP are at this moment awaiting the draft Environmental Impact Statement (EIS) required by Colorado.

TABLE III

PARACHUTE CREEK SHALE OIL PROGRAM
CHRONOLOGY OF MAJOR EVENTS

1920	Union Oil acquires its first Oil Shale properties in the Piceance Basin.
1940-1943	Union Oil conducts a wide range of laboratory and field work, seeking economically feasible methods of extracting usable oils from shale.
1955-1958	Union builds and operates a retort at its Parachute Creek properties.
March 1978	Union announces plans for a first phase commercial mine and retort that would produce 10,000 bls/day.
Summer 1978	Union begins applying for the more than 30 separate agency and subagency permits and/or licenses.
Late 1980	All necessary Federal, state and local permits received to begin mine and retort construction for Phase I.
Early 1981	Union completes acquisition of all permits and/or licenses for Phase I. Predevelopment mining operations begin.
July 1981	DOE awards Union price and purchase incentives whereby the Department of Defense agrees to purchase 7,000 bls/day of diesel and 3,000 lots/day of military jet fuel.
October 1981	Union Oil formally accepted into the Colorado Joint Review Process (JRP) for Phase II.
Late 1981	Site construction of the Phase I retort and upgrading facility begins.
March 1982	A Joint Agreement is prepared under the Colorado JRP which is to be coordinated by the Corps of Engineers, the State and Garfield County.
December 1982	Board of County Commissioners for Garfield County approve a Fiscal Impact Mitigation Program Resolution.

TABLE III (Cont'd.)

PARACHUTE CREEK SHALE OIL PROGRAM
CHRONOLOGY OF MAJOR EVENTS

January 1983	Union applies to SFC under Third Solicitation requesting a combination of loan and price guarantees for Phase II. Advances to strength review.
March 1983	Union submits qualification proposal to SFC under the Competitive Solicitation for Oil Shale Projects. Advances to Phase II under the Third Solicitation.
April 1983	SFC designates Union as qualified bidder in Competitive Oil Shale Solicitation.
May 1983	EPA and Union sign a Consent Order which permits limited commercial production of upgraded synthetic crude shale oil under §5(e) of the Toxic Substances Control Act.
June 1983	SFC finds competitive bid submitted by Union in May to be nonresponsive to Competitive Solicitation's requirements.
Late 1983	Phase I start-up began. Full production scheduled for 1984.
December 1983	Union receives letter of intent from SFC for up to $2.7 billion in price guarantees under the Third Solicitation for the Phase II expansion effort.
January 1984	Union submits draft Environmental Monitoring Plan (EMP) Outline for Phase II to SFC and consulting agencies for review and comment.

Because of the potentially large number of public hearings and because of the involvement of the county in the JRP, there is much room for consideration of those mitigating actions which fall outside compliance with regulation, such as economic and socioeconomic impacts. Thus, even though there is no statutory mechanism which allows the state to take direct action, there is a forum for necessary actions to be examined and determined. Other statutory authority, such as that of the counties in their permitting, zoning, and land use authorities, can provide opportunities to require that appropriate actions are taken.

The JRP cannot guarantee to shorten the review process in permitting nor can it ensure that mitigating provisions adequate to all needs accompany installation of a new plant in Colorado. What it can do, however, is to provide a clear view of the exact process through which industry and the public must go in order to achieve their respective ends and also to provide a monitoring agency which ensures that all necessary procedural steps are taken in proper order.

Local Government

Garfield County procedures are similar to those encountered by Union Oil in its negotiations with the state. Since the county's concerns are project-specific and supplemental, rather than being compliance-based, negotiation became even more of a general practice.[18] This phenomenon is not peculiar to Garfield County; even in those states which do not grant sweeping powers to their counties, statutes, licensing regulations, and permitting requirements are likely to be couched in general terms rather than in specific compliance requirements. There were, therefore, necessary negotiations in all areas of concern, with Union Oil, the county, and each jurisdiction able to negotiate at each point for its own protection or advantage.

Garfield County fits the classic definition of an area likely to feel adverse socioeconomic effects from a synthetic fuels project: rural, sparsely populated, with no major commercial center in close proximity, and without ready infrastructure for rapid housing expansion. At one time, Garfield County had not only the Union Oil project but

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[18] Colorado grants very broad powers to its counties so that on major permitting matters, Union Oil was required to deal directly with both the state and the county and to negotiate fiscal impact mitigation directly with the county. Garfield County is now in the process of developing a Master Permit process which incorporates all required compliance actions as well as fiscal impact mitigation.

Exxon's Colony project under development at the same time.[19] As can be seen from the map (Figure 2), there are only a few towns in the county. In 1980, the county population was about 22,500 with the largest towns being Rifle (3,200) and Carbondale (2,100). Grand Junction (approximately 50 miles from the project), however, is a significant commercial center in the area and will likely absorb some of the permanent residents.

In addition to the large financial impact mitigation commitments Union made under their Phase I contract, they agreed to provide additional temporary and permanent housing under the terms of their land use permit with Garfield County. However, from the standpoint of the county, there was no assurance that the agreements with Union Oil properly protect the county's interest or those of its municipalities. Additionally, there is no provision for mitigation of the potential impact of project closeout (of course, synfuels facilities are not unique in this regard). Neither did the agreements represent, from Union's viewpoint, assurance that the funds are either adequate or were planned to produce satisfactory socioeconomic impact mitigation, or in the right locations (as in the case of permanent employees preferring to settle in different communities from where the impact funds are spent). Subsequently, Garfield County and Union Oil agreed that a clear fiscal impact mitigation mechanism was required which would truly address the problem and that would also avoid the continual addition of new and unexpected requirements.

The Garfield County Board of Commissioners subsequently promulgated a Fiscal Impact Mitigation Ordinance which requires a fiscal impact analysis program including reports, reviews, identification of impacts, and proposals for mitigation. If Union goes forward with Phase II, they would be responsible for providing not only housing for its employees but for ensuring that infrastructure additions are funded -- by implication either directly by Union or through guaranteed tax or other revenues. A plan to mitigate the impact of project abandonment is also required. Compliance and monitoring provisions are included, and the entire program is made a condition of the issuance of the county's land use permit for the project.

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[19] The abrupt closing of Colony was a severe emotional jolt to the county and, at least initially, was expected to be a severe economic jolt as well. Fortunately, it appears that Exxon and Union worked with the county to moderate the economic impact. Some Garfield and Mesa County business and public representatives believe that, based on expenditures so far in support of synfuels development, they have between them the infrastructure for three to five plants and without them, the counties in the area will suffer to some extent because of a less than expected tax and population service base.

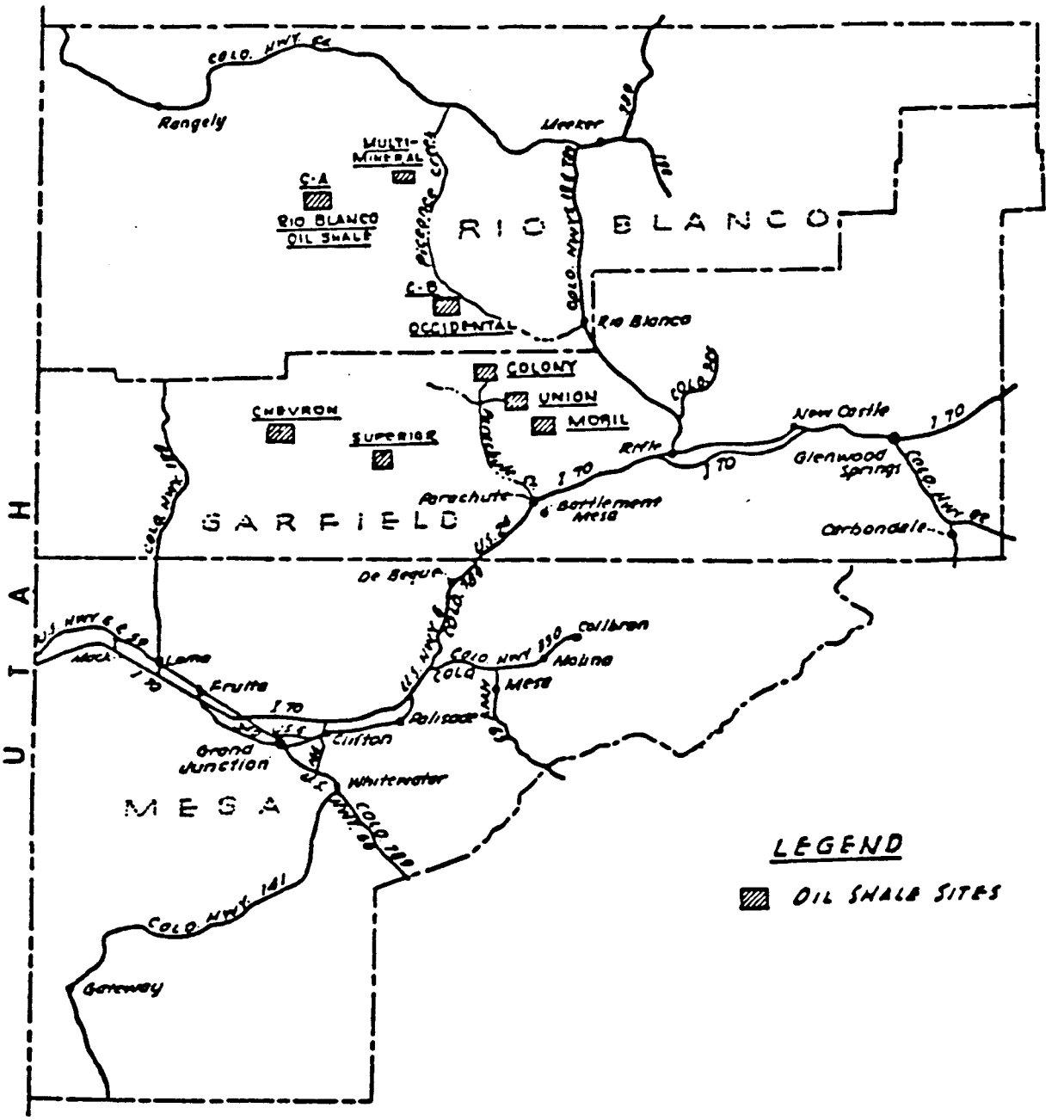

Figure 2. Garfield and Neighboring Counties

Garfield County has the only active shale oil project in Colorado (Union Oil). All others are in hold or mothball status.

Analysis of Case Study Features

DOE, in its initial role as financier, negotiated a contract with Union whereby conditions were designed to mitigate the immediate impacts of the project as well as to allow for the collection of information important to future synfuels acceptability. Phase II of the project, if it is successful at SFC, will allow increased opportunity to capture lessons which could benefit future facilities. Additionally, SFC's EMP process provides for the continuing involvement of DOE and EPA and establishes a mechanism for the coordination and exchange of environmental information.

The role of the state in the Union project has become increasingly important. Since the project's arrival at SFC, state requirements have filled some of the gap left by the need for additional Federal funding of certain environmental efforts. The state will continue to play an important role in the design of additional or supplemental requirements during Phase II, if the project goes forward. The application of the state JRP to Phase II should provide significant opportunities for greater coordination and public involvement and in identifying issues and areas of concern. It will also provide an opportunity to assess the efficiency of this approach as applied to synfuels. Because the JRP is well documented, Union's experiences with it will provide an excellent opportunity for its widespread evaluation and its potential consideration as a model for other states facing synfuels development.

Neither the permits of the State of Colorado nor its counties require significant beyond-compliance environmental monitoring. Although Union is required to submit to the state a research plan for environmental monitoring, Federal consultation involvement (through existing or potential financial agreements) in this early stage of shale oil development may be critical to the environmental monitoring and analysis which can lead to greater acceptability of shale oil synfuels development in the future. In the very near-term, it is likely that information benefits will be relatively low since effects (environmental, health, and safety and spent shale disposal) will tend to require some time to be fully established and substantiated, although earlier work at smaller scale, including revegetation activities, is available now.

The fiscal impact mitigation requirements which have been added formally to Garfield County's statutes provide a potential vehicle for protection against unexpected project closing. Under the ordinance, the company must propose the plan for mitigation. Since expected local tax growth may be included in the company's projection, the opportunity exists for industry to pay its fair share but no more, while at the same time local interests are addressed. The ability of Garfield County to shift the burden of socioeconomic impact mitigation to industry works well from the county's point of view. However, such mitigation is an up-front capital cost which could conceivably be more than the project sponsors would be willing to undertake.

The JRP and the Garfield County Master Permit now being developed are potentially important approaches to future acceptability in that they provide better assurance that synfuels projects will have a structured permitting and evaluation process to the extent that compliance-based requirements can give that assurance. Future acceptability of synfuels in general, however, will not likely be materially enhanced by these processes until results related to Federal supplemental programs are available, digested, and incorporated into permit considerations.

IV. CASE STUDY #3: COOL WATER COAL GASIFICATION COMBINED CYCLE PROGRAM SAN BERNARDINO COUNTY, CALIFORNIA

The Cool Water Gasification Program will produce synthesis gas as fuel for part of Southern California Edison's (SCE) generating facility in the high desert of California. As conditions of its recently awarded price guarantee contract with SFC, the Cool Water Program will monitor both consumptive and nonconsumptive uses of water, identify employment patterns and unforeseen socioeconomic impacts, as well as provide for supplemental monitoring of some unregulated substances of environmental or health concern (as defined in the Project's approved Environmental Monitoring Plan Outline). The project was granted inclusion in the California Energy Commission (CEC) single agency permitting process, which resulted in an expedited 17 month permitting span. One of the conditions of CEC certification required the development of an Environmental Surveillance and Monitoring/Worker Health and Safety Program.

The uniqueness of this project is implicit in the fact that it is the program participants rather than the Government who have ensured that project activities are designed to meet information gathering objectives which will ensure acceptability of future plants. These objectives are:

- to identify and rectify scale-up problems resulting from a six-fold increase in size;
- to verify the operability and controllability of the overall heavily integrated system in both steady-state and load following modes and under start-up, shutdown, and emergency conditions;
- to carry out extensive monitoring of environmental performance in compliance with the project permit conditions and to develop information for future planning;
- to develop and refine detailed operating, maintenance, and safety procedures which can be applied to future plants; and
- to obtain a comprehensive package of real plant data on a commercial scale which will allow decisions and plans for future application of the technology to be made with a high level of confidence and substantially reduced risk.

A critical aspect of this case study, then, becomes one of examining how and if "lessons learned" from this commercial experience will be captured rather than of examining the approaches to see whether a mechanism is provided to ensure that data is collected. The issue

becomes the availability of information (and whether or not this availability is necessary or practical) to regulators and Federal R&D organizations who may use it, along with other data and information, in creating a data base for future synfuels acceptability.

The unique combination of environmental, health, and safety approaches found in this project offers a much different viewpoint on future acceptability than the other two cases studied. The involvement of the key organizations (SFC, the Program, and CEC) is examined below.

Project Background

The SFC Board of Directors voted on July 28, 1983, to approve the final contract awarding $120 million in price guarantees to the Cool Water Coal Gasification Program. Prior to SFC becoming active and prior to the award of financial assistance from SFC, discussions concerning the possibility of DOE becoming a cost-sharing participant in the program were held in keeping with DOE's then active pilot and demonstration plant program for synthetic fuels. At that time, the responsible DOE program office was seriously considering this opportunity and had undertaken initial planning efforts. These discussions and plans were subsequently discontinued.

The Cool Water plant is located near the small town of Daggett, somewhat nearer to Las Vegas, Nevada, than to Los Angeles. (Figure 3 is a map of the area.) At the rated output, the (Texaco) gasifier would produce 900 million Btu per hour of synthesis gas to power a 100 megawatt (4,300 bpd oil equivalent) combined cycle electricity generating facility. It came under the purview of the CEC because of its classification as a thermal electric plant. While the process exempts all other state and local permits, the proposed facility still must meet these agencies' standards. The Cool Water Project, under construction and expected to begin production in 1984, is the third continuing synthetic fuel facility to receive U.S. Government financial assistance.

SFC Involvement

The Cool Water Project received the first direct award of financial assistance from SFC. As such, the project represents a landmark in the history of the newly created organization. The price guarantee commitment, dated July 28, 1983, is composed of seven volumes of material. Volume Seven is the Environmental Monitoring Plan Outline which is required pursuant to §131(e) of the Energy Security Act. An SFC Board approved Outline is required by SFC in its normal practice prior to entering into a financial assistance contract with a project sponsor.

The Cool Water Program first submitted a draft Outline in October 1982. The consulting agencies (DOE, EPA, and the state) provided written comments during November. The submittal was the "Environmental

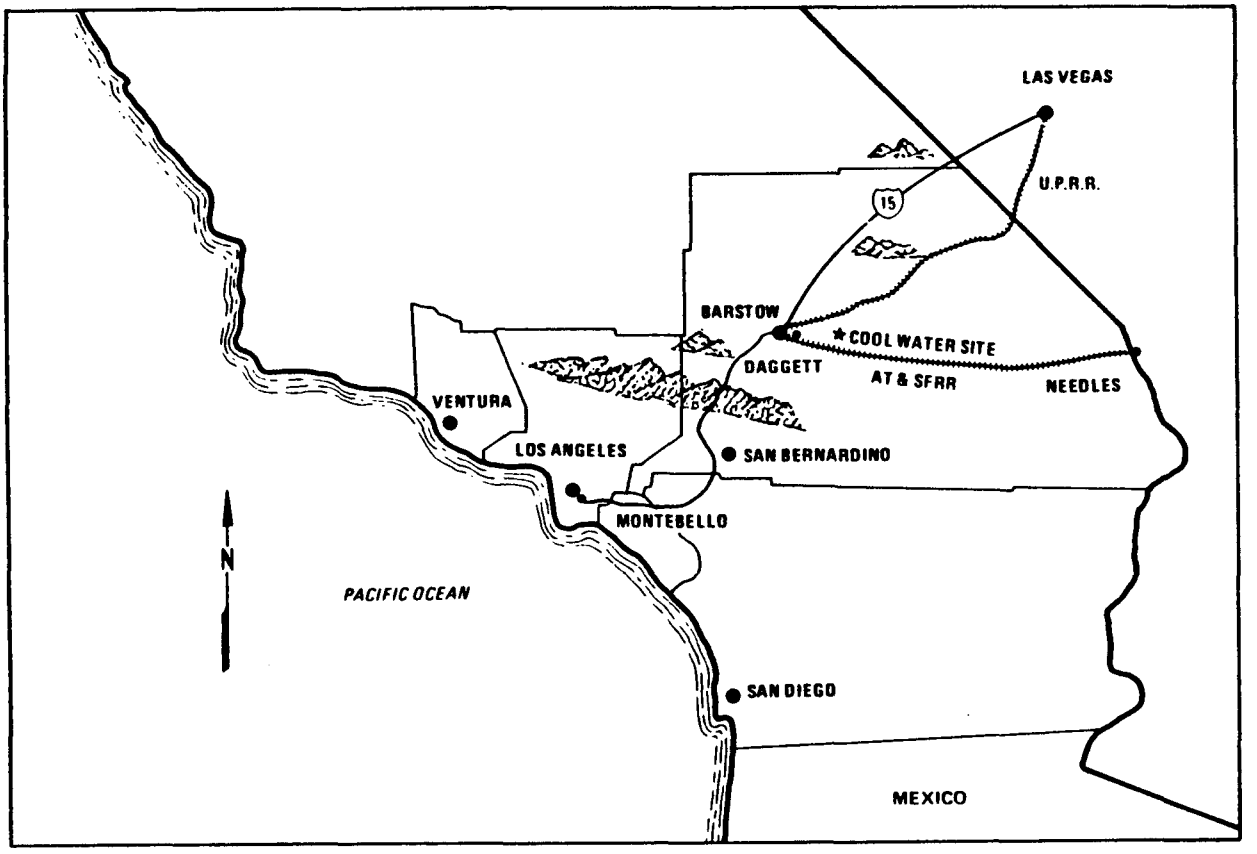

Figure 3. Map Showing Cool Water Site

The Cool Water Project is housed contiguously with three existing generating plants on land owned by SCE. In addition to the gasification plant and the combined cycle generating station, the project includes a rail parking yard and a solid waste holding facility.

Surveillance and Monitoring/Worker Health and Safety Program Plan" previously submitted to CEC in February 1981 to fulfill a condition of the certification process. The consulting agencies responded in a generally favorable way by commending this initial effort while at the same time identifying areas of further concern.

On February 17, 1982, SFC proposed a "letter of intent" with a maximum obligation of $120 million in price guarantees for a five-year duration and with SFC participating in revenue sharing. In early June 1983, Cool Water submitted their second draft EMP Outline for review by the consulting agencies. This submittal was not significantly different from the first one. A third draft was submitted later in June but was still felt to be less than adequate by the consulting agencies. A final draft was submitted in mid-July and approved by SFC on July 28, 1983. No written communications on either the third or final Outlines were received from the consulting agencies prior to or after SFC's approval.[20]

In substance, the approved Outline fully describes Cool Water's planned compliance monitoring activities and incorporates significant background information on the project, including CEC's Final Environmental Impact Report. A draft EMP, developed and based on the approved Outline, was submitted to SFC and the consulting agencies in December 1983. Review and comment on the submission are proceeding in accordance with SFC's EMP Guidelines. The Program committed in the Outline to the phased monitoring of certain unregulated pollutants suspected to occur during the process. It is unclear whether additional or supplemental monitoring activities will be agreed to, or imposed on the sponsors by SFC, during the EMP phase of this process.

Other conditions of the SFC agreement include requirements that the program submit employment pattern reports through the first quarter of operation and information regarding mitigation of any previously unforeseen socioeconomic impacts. Additionally, the Program is required to monitor and report on both consumptive and nonconsumptive uses of water, which is redundant with existing CEC requirements.

Reporting of environmental monitoring data is to be treated in accordance with the Environmental Monitoring Plan to the extent it is not inconsistent with the Corporation's Guidelines on Disclosure and Confidentiality. The EMP Outline shows a commitment for reporting such data on unregulated pollutants found in significant concentrations, documentation of changes in feedstocks or process operating conditions,

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[20] The communications on the Outline during late June and July from the consulting agencies were primarily through telephone conversations and staff meetings with SFC. However, an internal EPA memorandum, dated June 29, 1983, documents seven major deficiencies of the Outline. DOE's position on which issues should receive attention and commitment by SFC and the sponsors, prior to approval, were identified in its formal response on the second draft Outline.

documentation of whether any permitting conditions were violated, and copies of all compliance reports sent to regulatory agencies. Additionally, the monitoring data will be reviewed at Monitoring Review Committee Meetings. The members, functions, and scheduling of meetings for this committee are not described.

California State Involvement

The CEC is the state agency responsible for the location of power-generating facilities in the state. CEC has authority under the Warren-Alquist Act to certify that power plants are constructed, if they are needed, in an environmentally acceptable manner. CEC also has authority to look at new technology (specifically the Cool Water coal gasification process), and to see if it can be built in an environmentally acceptable manner that is also economical and will help benefit the use of alternative energy sources in the state.

CEC is the lead agency in the state from which approval must be received to construct a power plant. The first phase for obtaining approval is the submission of a Notice of Intention (NOI) and the second phase is the Application for Certification (AFC).[21] Both the NOI and AFC phases of the CEC process involve public information meetings, workshops, and public hearings. The hearings cover the full range of issues including need, design, environmental impacts, safety, rates, and financial issues. Other state and local agencies including, for example, the California Public Utilities Commission (CPUC), the Air Resources Board (ARB), and the local Air Pollution Control Districts (APCDs), participate in the CEC process. The "Permit to Construct" received from CEC is in lieu of all other state, local, and Federal permits to the extent permitted by law.[22]

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[21] NOI is a site-screening phase of at least three alternative sites; AFC is a detailed review of one site approved through NOI. It is during the AFC phase that the Environmental Impact Report is prepared by CEC.

[22] The CEC represents a "one-stop shop" for most permits, except the CPUC, the EPA, and the Federal Aviation Administration (FAA). The CPUC does issue a permit, in addition to that issued by CEC, which addresses the rate and financial aspects of a project. In addition, a Prevention of Significant Deterioration (PSD) air quality permit must be obtained from EPA. Therefore, these three permits represent the primary approvals required to construct a power plant.

The California Air Pollution Control Districts (APCD) exercise great power in regulating industry of all kinds. They exist to enforce standards set for each district by the state.[23] The San Bernardino Desert Air Pollution Control District, for example, was the first agency to be satisfied by CEC; in California there is no record of the overturning of any APCD refusal of a permit.

Counties and localities in California operate under charters which limit their ability to modify state regulations in most matters. County and city governments participate, but so long as CEC actions conform to the state-approved master plans, they have no veto power.

After the NOI was filed by SCE in July 1978, CEC conducted eight public workshops and hearings,[24] coordinated with other state agencies, and issued a final decision in 17 months. Table IV is a chronology of major events associated with the Cool Water Project, including permitting actions by CEC to date. Table V lists the conditions and submittals soon to be met for operational certification as imposed by CEC.

Public comments during the permitting process centered mainly on air quality with discussion of water usage (including questions regarding use of City of Barstow treated waste as process water) and groundwater pollution receiving a significant amount of attention. APCD monitors show that both air quality and water quality are lower in the county in the last several years; part of the air problem is encroaching pollution from the southwest but the existing SCE plant is also blamed by the public, not only for near-plant pollution, which is demonstrated, but for pollution at some distance, which is unproved. Publicly voiced concerns, however, did not result in either major changes or in appeals.

One of the conditions of the Cool Water Project's certification required that an Environmental Surveillance and Monitoring Program be developed in consultation with the CEC staff and the California Department of Health Services prior to start of construction. The final plan is to be submitted to CEC 150 days prior to start-up. In addition, a Worker Safety and Health Program for the operational period must be

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23 The state-imposed standards are so strict in all districts that more often than not it is the county or municipality which seeks the relaxation in an attempt to encourage business, acquire more water and power, and so on.

24 CEC conducts the public hearings and is responsible for replies to comments but SCE was required to provide data and analysis. CEC also distributes copies of all draft and final materials to all affected agencies, both state and local, for comment and advice.

TABLE IV

COOL WATER COAL GASIFICATION PROGRAM
CHRONOLOGY OF MAJOR EVENTS

Winter 1978	Southern California Edison (SCE) and Texaco Inc. agree to perform preliminary studies for a commercial-scale gasification system.
July 1978	SCE files a Notice of Intention (NOI) with the California Energy Commission (CEC) for certification of the Cool Water site.
October 1978	SCE files Preliminary Environmental Assessment with CEC.
November 1978	CEC issues an order converting the NOI proceeding to an Application for Certification.
July 1979	SCE and Texaco enter into an agreement to build and operate a 100 MW coal gasification power plant.
October 1979	CEC issues a draft Environmental Impact Report for public comment.
November 1979	Application is submitted to the California Public Utilities Commission for a Certificate of Public Convenience and Necessity.
Late 1979	SCE begins obtaining the required one year of monitoring data on the existing site local environment, in order to obtain a Prevention of Significant Deterioration permit.
December 1979	Construction permit is granted by CEC.
January 1981	Filed Draft Environmental Surveillance and Monitoring Program with CEC and California Dept. of Health Services for review and comment.
June 1981	SCE receives final approval of a Certificate of Public Convenience and Necessity from the California Public Utility Commission.
December 1981	Construction is initiated. Prevention of Significant Deterioration permit received.
May 1982	Cool Water Project sponsors apply for a price support under SFC's Second Solicitation.

TABLE IV (Cont'd.)

COOL WATER COAL GASIFICATION PROGRAM
CHRONOLOGY OF MAJOR EVENTS

October 1982	1st Draft EMP Outline submitted to SFC and consulting agencies for review and comment.
April 1983	SFC signs letter of intent to provide $120 million in price guarantees.
June 1983	2nd and 3rd Draft EMP Outline submitted to SFC and consulting agencies for review and comment. Expected to initiate formal contacts with EPA regarding applicability of §5 of the Toxic Substances Control Act.
July 1983	SFC approves EMP Outline and final contract for award of financial assistance.
December 1983	Draft EMP submitted to SFC and Consulting Agencies for review and comment.
January 1984 (Approx.)	Final Environmental Surveillance and Monitoring Program Plan due to CEC.
June 1984	Initial production expected to begin.

TABLE V

COOL WATER PROJECT
CERTIFICATION CONDITIONS OPERATIONS

1.	Worker Safety & Health Program	CEC Cal OSHA	90 days prior to start-up.	Must be reviewed and approved by Cal OSHA prior to filing with CEC.
2.	Facility Design Safety Code Compliance	CEC	90 days prior to start-up.	
3.	Handling, Storing & Disposal of Hazardous Wastes	CEC	150 days prior to start-up.	Dept. of Health approval required prior to filing with CEC.
4.	Testing of Product Wastes	CEC Dept. of Health Services	180 days after start of operations.	
5.	Final Monitoring & Surveillance Plan	CEC	150 days prior to start-up.	Plan to include expected dates for tests and availability of results.
6.	Noise Survey - Machinery & Equipment	CEC	90 days after operations.	
7.	Noise Survey - Employee Protection	CEC	90 days after start-up.	
8.	Fire Protection Program	CEC	90 days prior to start-up.	
9.	Combined Cost Report	CPUC	1 year after commencement of operations.	Order #9 of CPUC Decision #93203.
10.	Report on Capital Cost & Coal Expense	CPUC	36 days prior to commencement of operation after predemonstration period.	Order #11 of CPUC Decision #93203.
11.	Fire Protection Program	CEC County Fire Wardens Office	30 days prior to scheduled start of operations.	

formulated with concurrence from the CAL OSHA Consultation Service and submitted to the CEC staff not later than 90 days prior to start-up (a construction program was also required).

Table VI lists the program participants monitoring responsibilities and also summarizes the planned scope of monitoring under the plan. The reporting requirements under this plan require quarterly reports for all continuous and periodic measurements and one special report on the results of compliance testing for air emissions.

Cool Water Program Special Involvement

The Cool Water Program is a demonstration plant with objectives somewhat different from those of a normal commercial venture. In 1979, the Cool Water Program Management Committee created the Test Plant Committee (comprised of participant representatives) and charged it with developing testing and data acquisition procedures (including environmental assessment) to achieve project objectives. The special environmental tests are of interest here.

Special environmental tests will be conducted at different frequencies and intensities depending on the phase of operation. Additionally, they may be conducted and evaluations will take place if there are any major equipment or control modifications. The performance of environmental control systems of interest will be regularly monitored and compared to "expected" or "design" performance. Various control strategies will be evaluated during normal system operation and system emergencies. Furthermore, the environmental tests are intended to characterize the environmental acceptability of the plant and establish an environmental data base for future plants.

Regular environmental monitoring will be conducted over the life of the project to characterize the environmental impact of the plant. Emphasis will be on effluent streams, but any high levels of noxious compounds will also be identified. In addition to this regular monitoring, special tests will be conducted on the design coal and on participants' test coals at selected operating conditions. The object of these tests will be to gather sufficient data so that environmental performance can be predicted for likely commercial plant configurations.

These special environmental efforts are similar to the supplemental program of the Great Plains Project but are more extensive in some areas while completely excluding others (i.e., epidemiology). However, combining the CEC required environmental and health plan together with the additional minimal requirements of the SFC-required EMP, the overall Cool Water Program effort goes much further than the other cases studied to create a complete environmental, health, and safety data base for future synfuels acceptability. It is not clear at this writing how or if the special environmental plans of the program described above have been modified or changed or if the resulting data

TABLE VI

COOL WATER PROGRAM
PARTICIPANTS MONITORING RESPONSIBILITIES

Participant	Monitoring Responsibility
SOUTHERN CALIFORNIA EDISON	1. Ambient Air Quality and Meteorology
	2. Evaporation Pond Water Quality
	3. Combined-Cycle Air Emissions (except for compliance at start of operations)
	4. Cooling Tower Blowdown Analysis
	5. Cooling Tower Stack Emissions
	6. Feasibility of Epidemiological Study
	7. Determination of Hazardous Classification of Waste and Mutagenicity
	8. Ambient Air in Vicinity of Waste Storage Ponds
TEXACO, INC.	1. Sulfur Recovery Tail Gas Vent Emissions
	2. Gasification Plant Solid & Liquid Waste Compositions
	3. Gasification Plant Internal Process
GENERAL ELECTRIC	1. Combined-Cycle Exhaust Compliance Test at Start of Operations

and information will be available to SFC or the consulting agencies. It is likely that the Cool Water Program would want most of this data held confidential or labeled proprietary in the interest of future technology marketing and transfer. Whether it is critical for the Government to have access to this data base, especially considering the Program's obvious commitment to excel in this area, remains an issue of contention which will surely arise again and again in the future as the industry develops.

Analysis of Case Study Features

The several unique features of the approaches used for the Cool Water project -- the sponsor's lead in identifying, recording, and mitigating environmental uncertainties associated with the process; the expedited permitting process allowed through CEC and associated health and safety requirements; and the additional monitoring requirements of SFC -- undoubtedly come together to form the most comprehensive approach of the cases studied in ensuring this project's and future projects' acceptability. The main omission is related to socioeconomic impact mitigation. Even this, however, does not detract from the overall process as the project is located in an already developed site where such concerns were previously addressed.

The individual components of each feature are also unique. The Program sponsors' approach, with their somewhat different overall objectives, represents a thorough approach to ensuring that the technology they are promoting will not be impeded with high risks or unknowns regarding the environmental effects of the process. The CEC process is an extraordinary approach to dealing effectively with the regulatory process, allowing much of the uncertainty and time required for obtaining necessary permits and approvals to be removed from an otherwise often lengthy and burdensome process, while at the same time ensuring that the concerns of society in general will be addressed. SFC's involvement is also unique in that this first financial award is also the first test of the EMP process and the effectiveness of the consulting agencies to influence a project sponsors' environmental activities.

Regardless of the probability that this comprehensive, overall, and totally unique combination of approaches will produce an equally admirable environmental, health, and safety data base from which many diverse lessons can be learned, it is unclear what role government will play in analyzing and capturing these lessons or what particular information benefit it will gain from its financial investment. It does appear realistic to assume that future or replicated Cool Water projects will benefit immensely from these combined efforts. In terms of rapid deployment capability, much can be said about the overall benefits of this experience. The Cool Water Program has illustrated that even with expedited permitting and a compressed time frame for

development and approval of their EMP Outline, effective environmental provision can be achieved successfully, especially if the sponsors are willing to go the extra mile themselves in ensuring environmental acceptability.

V. SUMMARY OF CONCLUSIONS

The preceding investigation of early approaches to achieving environmental acceptability was initiated because the mission of this Advisory Committee is specifically to advise the Secretary of Energy on matters such as this. The Committee has drawn on the resources available to it in this effort and has attempted to capture information derived from the participants and sponsors of the projects examined. It is recognized that the limited scope of this investigation may be considered a brief and somewhat narrow look at the total synthetic fuels industry. However, it is believed that this report does provide a valuable point of departure for future considerations in this area. It is also felt that the issues raised are of concern not only to the Advisory Committee, but potentially to a much larger audience. Some attempt to frame the results of this investigation into a format useable to others was, therefore, believed to be appropriate. The desirability of this approach was confirmed when it came to the Committee's attention that similar issues were indeed being raised elsewhere.

As mentioned in the introduction to this report, policies set forth at the Presidential and Congressional levels must be developed with understanding of their implementation through Federal agencies and state and local governmental entities. Monitoring of the effect and effectiveness of these policies in achieving stated objectives is inherent in this process. Where there is limited experience with the implementation of a given policy or directive, such as the need to develop synthetic fuels in an environmentally acceptable manner, monitoring during the initial phases can be a significant factor in decisions affecting future orientation of the policy. A principal example of Congressional efforts to conduct the above mentioned monitoring, is contained in a request by the Chairman, Subcommittee on Fossil and Synthetic Fuels, Committee on Energy and Commerce, U.S. House of Representatives, to the U.S. General Accounting Office (GAO). This request concerned the preparation of a report to address the following questions:

-- How is the existing "system" working to protect the environment while a synthetic fuels industry is being developed recognizing that there is limited experience with projects being constructed?

-- Are Government controls over the environmental impacts of synthetic fuels necessary and/or sufficient? Are the levels of government involvement resulting in overlapping programs? Do the layers of Government involvement enhance or impede environmental protection?

-- Are projects structured to protect the environment?

-- Is information on environmental effects being collected, transferred, and used to determine potential and unknown impacts for future projects? Who is responsible for coordinating this effort? Should it be done on a national basis?

The Advisory Committee, having addressed similar concerns throughout its activities, found these questions to be a highly suitable mechanism through which to present the conclusions derived from this independent investigation. It is believed this approach will also allow for comparison by our Government representatives of potentially varying or similar viewpoints concerning these issues. Thus, this approach may assist the Government in its ability to make prudent decisions and provide sound policy guidance in this area for the Nation. It should be noted, however, that the initiation of this investigation was proposed and undertaken completely independently and without knowledge of the Congressional request for a report from GAO. Additionally, these investigations are based solely on the results of the present investigations and the activities of this Advisory Committee to date. Because of these factors, the conclusions presented are without bias and totally in keeping with our role as an independent governmental advisor. Our conclusions are presented below as answers in response to the above questions.

Q. How is the existing "system" working to protect the environment while a synthetic fuels industry is being developed recognizing that there is limited experience with projects being constructed?

A. The "existing system" used to protect the environment must be judged, if it is to be judged now, on the limited experience with projects being constructed. This existing experience clearly illustrates that the pioneer projects being constructed with Federal financial assistance, although provided such assistance under different authorities and guidance and during a time of changing Federal missions, are working successfully to achieve environmental protection not only as individual projects but in terms of benefits to future projects. The "system" employed for each of the projects studied varies significantly. Each has strong points and unique features which appear to be highly effective. A common issue concerns the need for early negotiation with adequate legal and funding authority to ensure that more than minimal environmental protection activities will take place. More than minimal protection must be ensured in these early facilities for obvious reasons: the current regulatory structure does not contemplate all the potential impacts of this developing industry and protection standards should not be imposed without adequate commercial experience; sound information will need to be derived from the early experiences to better identify and hopefully mitigate concerns prior to the necessity of imposing regulations; and definition of unknowns and potential hazards will allow for better protection and mitigation efforts when synthetic fuels are needed most, thus allowing increased overall acceptability and reduced risks to both the industry

and public. A potential issue in this respect is the inconsistency of Federal approaches during changing mission responsibilities. A measure of consistency will go far in alleviating both public and private controversy and concerns about what is to be expected in terms of environmental protection needs and requirements. This issue is further complicated by inconsistencies in data and information reported and captured, and the open availability of it. It appears that such availability is necessary for increased understanding of the impacts and improvements in mitigating and controlling them. Continued independent evaluations and recording of activities and results is necessary as current projects develop and others are put in place. This is especially important for projects awarded financial assistance from SFC and projects developed without governmental assistance because the least information is currently available on these latter projects.

Q. Are government controls over the environmental impacts of synthetic fuels necessary and/or sufficient?

A. Government controls over the environmental impacts of synthetic fuels are necessary and at all levels of government. Governmental involvement at all levels implies broad representation and input which is critical in these early stages to acquire sound experience and ensure that all aspects of environmental acceptability are examined and achieved. An emerging and competitive industry is not likely to take upon itself the burden of potentially costly environmental protection. Consistent and equitable application of controls on this industry is also desirable so that the "rules" of the "game" are understood by all concerned.

The sufficiency of current government controls varies considerably and understandably. Traditional regulatory controls may be insufficient without the imposition of additional or "supplemental" requirements. Due to limited commercial experiences, it is unlikely that the state and local governmental entities will be able to establish sufficient controls without Federal assistance, either in the form of direct technical guidance or new funding to examine and alleviate unique impacts or concerns. The projects investigated by this Committee clearly illustrate the interdependence of the various levels of government in achieving environmental acceptability. There remain, however, some potential problem areas. These involve the ability of state and local governments to deal with project shutdowns or abandonments and the liability of the project sponsors in dealing with unanticipated social or environmental impacts. These potential problems do not appear to be unsurmountable, but additional governmental and private sector planning may be necessary. The issue becomes not whether or not impacts occur now or in the future or could or should something be done now, but one of a trade-off between who pays and who benefits.

Q. Are the levels of government involvement resulting in overlapping programs?

A. Based on the investigations of this Committee, there is really very little overlap between the levels of government and their involvement in programs designed to promote acceptability of synfuels, other than duplicate paper work and reporting requirements. It is unclear how much of a problem this is or how significant a burden it is on industry. Clearly, overlapping regulatory functions between Federal and state agencies are minimal. It also appears that the working procedures now established by SFC for increased coordination between the levels of government are beneficial in reducing potential overlap in programs undertaken by the various entities. Some overlap in specific requirements of the levels of government is noted, however, these appear to be working beneficially in encouraging information transfer, in adding "legal weight" to requirements, and, where the state or local government is duplicating a federally-imposed requirement, in assisting the future ability of these groups to deal with potential problems in the absence of Federal controls. It is noted that overlap occurs in some instances within a state or local government, such as redundant requirements of multiple agencies. This problem deserves attention but is probably better handled within these groups. On the other hand, there is overlap which occurs within both the Federal and state levels of government which is designed to promote understanding of related concerns by different disciplines which may affect the outcome of a resolution. Such overlap appears beneficial.

Q. Do the layers of government involvement enhance or impede environmental protection?

A. The concept of "layers" of government involvement incorrectly implies that environmental protection is contingent upon authority to enforce controls at higher and higher levels of government. Strictly speaking, involvement at the highest level of government is to provide the necessary authority to impose environmental protection requirements, and presently, obligational authority to carry out programs designed to achieve this goal. This involvement will accordingly enhance or impede environmental protection efforts by the implementing layers of government. This mechanism allows the different levels of government to focus on activities for which they are most qualified, interested, and assigned mission responsibilities. Substantively, the responsibilities of these levels clearly differ and do not, in fact, impede environmental protection. It is not clear, however, that environmental protection is particularly enhanced by these layers of government, unless coordination is deliberately sought and a mechanism to raise issues early is available. At this point in time, it is critical that all levels of government are involved and working together to increase understanding and prepare for the deployment of the synfuels industry in an environmentally acceptable manner. Over time, and with the

absence of the Federal presence through the SFC consultation process, this early involvement at all levels should enhance future environmental protection due to a broader base of knowledgeable and experienced personnel.

Q. Are projects structured to protect the environment?

A. Projects awarded Federal assistance to date and considered in this report are structured to protect the environment both by commitments to supplemental activities and through compliance conditions. This was accomplished through a variety of approaches which were dependent on how the projects were financed, the structure and authorities of state and local governments, as well as their ability to deal with unknowns and their willingness to impose requirements beyond ones established at the Federal level. Issues which cannot be fully addressed include the commitment of SFC and project sponsors to conduct complete supplemental activities which may be costly to the project, the continued adequacy of research funds provided to DOE and EPA to complement these activities, and provision of socioeconomic planning funds to states and counties. Without such commitments, it may be that eventually some well meaning regulations are imposed which prove to impact environmental advantages which otherwise could be addressed early. In the socioeconomics area, two of these early projects address very adequately the protection and mitigation requirements of their existence. They can probably be expected to be unique, however, due to heavy Federal involvement and assistance associated with these aspects. This is a real potential issue for future projects which must be considered in light of changing economic and energy patterns and expected rate of deployment of the synfuels industry. Isolated cases such as the ones examined here may not be truly representative or reflective of future facilities in all aspects of environmental acceptability without continued Federal assistance and involvement in the near term. It is not clear that industry, on its own, will provide or be expected to provide this protection voluntarily.

Q. Is information on environmental effects being collected, transferred, and used to determine potential and unknown impacts for future projects?

A. It is apparent that information on environmental effects is being collected, either through governmental requirements for such or because private industry wants the information to improve marketability of their products and technologies. It is not apparent that all the information needed to determine potential and unknown impacts for future projects is being or will be transferred to those who could beneficially use it in government. Where industry is collecting but not transferring the information to government, it is unclear whether industry will use it to identify implications or not or whether they will use it to avoid being saddled with new requirements. Transfer of information is also apparently impeded by

proprietary considerations and the interests of private sponsors to avoid premature release of early data without sufficient analysis. Sponsors are understandably "gun-shy" of unwarranted adverse or scare tactic publicity, premature establishment of new permit conditions or regulations, and the ability of the government research community to adequately protect proprietary data or derived proprietary information through use of increasingly sophisticated models. How much data needs to be transferred to government to determine potential and unknown impacts is also in question. Part of this uncertainty may be attributed to lack of efforts on the part of government to fully define what information is needed to address environmental questions. An area of even greater uncertainty is how or if the information would be used by government if the government does not have a specific mandated mission and funding authority to allow for this. Of the cases studied, it appears that the Great Plains Project currently has the most potential to be effective in all three of these areas. Yet only time will tell how much is gained from the exercise. Also the opportunity exists, through SFC's EMP process, to improve and increase the collection, transfer and use of information once, and if, a formal financing mechanism for such activities is established.

Q. Who is responsible for coordinating this effort?

A. No single entity is currently responsible for coordinating the collection, transfer and use of environmental information. Clearly it is a government function. As noted above, SFC is in a reasonable position due to its direct role in financing private ventures to provide for such a mechanism, given the authority. DOE has had significant and reasonably successful experience already in this area and has in turn cooperated with EPA. Neither DOE or EPA, however, has a clear mandate to undertake this responsibility. The information will be needed at all levels of government and by the private sector if it is to benefit the future of the industry. A regional or state role should also be considered especially where reasonable resources exist to encourage industry concentration, for this is where the information will ultimately be most needed. In summary, such coordination is likely to be poor if voluntary action and expenditure by either the private or public sector is required.

Q. Should it be done on a national basis?

A. Some part of the responsibility, if not all, reasonably should be done on a national basis, especially in the early development of the industry and while the Federal Government is heavily involved in the industry's commercialization. The information should be nationally accessible and its establishment on a national basis is therefore reasonable. If it is done on a national basis, it will also allow for continuation of the guidance and support to state and local governments which has historically stemmed from Federal involvement and initiative. A key question is how far should the Federal Government go in this or is it already too involved?